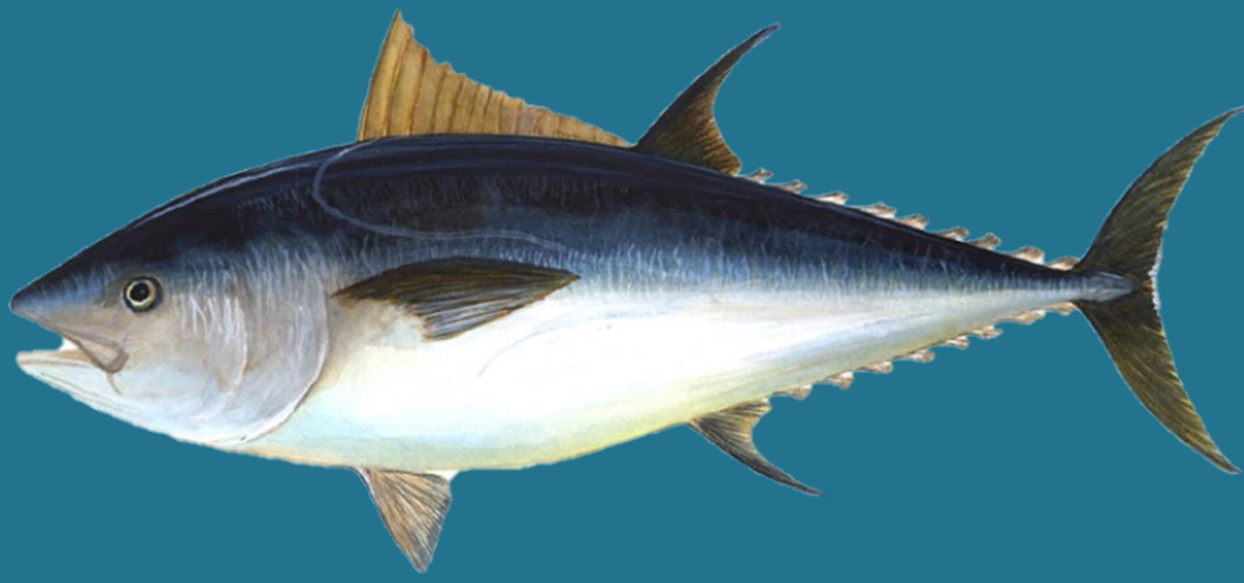
ATLANTIC BLUEFIN TUNA TAGGING PROGRAMME IN IRELAND 2016



Bluefin Tuna (*Thunnus thynnus*) Linnaeus 1758

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Foras na Mara

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1. Summary of tagging in 2016

Tagging was successfully carried out in 2016 with 16 bluefin tuna tagged and released with satellite pop-off tags in October and November (Table 1). All tagging was carried out under a project licence from the HPRA and all tagging was carried out by licenced and trained personnel. SFPA were made aware of the programme and identities of the vessels, skippers and scientific personnel and a derogation was obtained for scientific research fishing. A Research Mortality Allowance (RMA) was obtained from ICCAT who also supplied ICCAT floy tags for identification of fish if recaptured at a later stage. All data derived from the tagging programme will be shared with ICCAT in due course.

2. Introduction

Electronic tagging using archival tags by Block et al. (2005) highlighted the potential importance of the coast of Ireland and the UK as migratory routes for Atlantic bluefin tuna. A 191 cm fish tagged in waters off North Carolina showed trans-Atlantic migrations to the Mediterranean Sea and multi-annual site fidelity to waters off Ireland and the UK. This single track suggested that after a juvenile foraging period in the west, Atlantic bluefin foraged in the waters of the east Atlantic off Ireland and then undertook migrations to the Balearics and other known Mediterranean spawning areas. The only dedicated electronic tagging activity off Ireland was conducted in 2003 and 2004 by a scientific team from Stanford University, Tag-a-Giant (TAG), and the Irish Sea Fisheries Board (Cosgrave et al, 2008; Stokesbury et al. 2007). Tagging of fish in Irish waters demonstrated that Atlantic bluefin released in Irish waters travel between European foraging grounds, known eastern breeding regions (Mediterranean Sea; Malta) and western Atlantic waters. These data also highlighted a tentative link between bluefin caught off Ireland and western management regions. In addition, recent electronic tagging of ABFT off Scotland has shown local movements of Atlantic bluefin tuna around Scottish waters (Neat et al. 2014), to the north of Ireland, and further south. Given these insights it is important that stock origin, habitat utilisation and large-scale movement patterns of these Atlantic bluefin are characterised in more detail to ensure that the population models and concepts used in Atlantic bluefin tuna stock assessment and Management Strategy Evaluation (MSE) are parameterised as accurately as possible.

Investigation of the distribution and movements of Atlantic bluefin tuna in Irish waters is now a priority for Ireland. The ocean waters off south Donegal are now regarded by the International Commission for the Conservation of Atlantic Tuna (ICCAT) as an important area for Atlantic bluefin tuna and indications are that significant numbers arrive in the area over the period August to November each year. The Department of Agriculture Food and the Marine (DAFM) requested that the Marine Institute carry out a bluefin tagging programme in autumn 2016 to support the International Commission for the Conservation of Atlantic Tuna (ICCAT) Grand Bluefin Year Programme (GBYP) Atlantic research programme for Bluefin tuna.

ICCAT is an inter-governmental fishery organization responsible for the conservation of tunas and tuna-like species in the Atlantic Ocean and its adjacent seas. ICCAT compiles fishery statistics from its members and from all entities fishing for these species in the Atlantic Ocean, coordinates research, including stock assessment, on behalf of its members, develops scientific-based management advice, provides a mechanism for Contracting Parties to agree on management measures, and produces relevant publications. The Atlantic-wide research programme for Bluefin tuna was officially adopted by the ICCAT Commission in 2008 with a key priority being to improve understanding of key biological and ecological processes through electronic tagging experiments to determine habitat and migration routes. GBYP was adopted as official acronym of the research, which was initiated at the end of March 2010.

(ICCAT) manage Atlantic bluefin stocks under a two stock hypothesis for management and assessment i.e.

- Eastern Atlantic Ocean and Mediterranean Sea stock, that spawns in the Mediterranean Sea
- Western Atlantic Ocean stock, that spawns in the Gulf of Mexico,

with a boundary line dividing the stocks at 45 W longitude.

Results of tagging research by ICCAT and their collaborators indicates that movement across the currently assumed east-west boundary in the Atlantic, does occur. ICCAT now recognise the need to develop quantitative knowledge of mixing rates and integrate this knowledge into the assessment and evaluation process.

The Mediterranean and Eastern Atlantic bluefin tuna (considered a single stock) is a highly regulated species with annual catch limits set by the International Commission for the Conservation of Atlantic Tunas (ICCAT) based on scientific advice.

The EC became a Contracting Party to ICCAT (the International Commission for the Conservation of Atlantic Tunas) in 1997. EU TACs and quotas for Bluefin Tuna were set by Council for the first time at the December, 1997 meeting in order to implement ICCAT catch limits/TACs for these species. Ireland did not have a track record of targeting bluefin tuna and does not have a quota. Ireland has access to a by-catch “others” quota for MSs without a quota share to cover by-catches of BFT in commercial fisheries subject to certain conditions. Ireland has no quota to cover recreational fishing for BFT and has had no such quota since 1997. This tagging programme has been developed to improve understanding of the stock and migratory patterns.

As the northeast Atlantic is now recognised as an important feeding habitat for Atlantic bluefin tuna and in particular, the coastal waters off the north west of Ireland, where sightings of Atlantic bluefin tuna during summer months are increasingly common further investigations in this region could prove important in addressing knowledge gaps that may further support the future implementation and development of a Management Strategy Evaluation (MSE) framework and a spatially-explicit mixed-stock assessment model for Atlantic bluefin tuna stock assessment.

In 2016, a collaboration was established with international experts in Atlantic bluefin tuna research comprised of the Marine Institute (MI), Stanford University (SU), University of Exeter (UoE) and Acadia

University (AU). Intensive preparations in September by allowed the Irish Bluefin Tagging Programme to commence off the Co. Donegal coast in the second week of October 2016.

2.1 Legislative/formal preparation:

Registration was required with the Irish Animal Welfare Authorities (HPRA) for licencing of the project under EU Directive 2010/63 and S.I. No. 543 of 2012 e.g. application for and receipt of short term Animal Welfare Licences for individuals from USA, Canada and the UK.

An amendment was made to an existing Health Products Regulatory Authority (HPRA) project licence to include Blue Fin Tuna in telemetry studies.

Formal letters of invitation to US/Canadian collaborators were issued by the Marine Institute to participate in international research programme in Irish waters.

Acknowledge of programme from ICCAT was sought and specific inclusion of the Marine Institute in the International Research Mortality Allocation (RMA) was received (Appendix I).

Derogation of fishing for Bluefin Tuna fishing for the purposes of research was reviewed and granted from the Irish Sea Fisheries Protection Authority (Appendix 2).

2.3 Financial preparation:

Application was made to the Department of Agriculture Food and the Marine (DAFM) for a research budget to cover technical equipment (10 satellite tags), vessel charter, technical support of Marine Institute staff, fees for HPRA Animal Welfare licences and costs to allow experts from the USA and Canada travel to Ireland to assist with a) establishing the project, b) training of technical and scientific staff and c) tagging operations on board the charter vessel.

An Official call and open tender (ETender) process for Vessel Charter and formal evaluation of tenders was implemented.

Ordering and purchase of ten satellite tags to arrive in time for the charter period.

Establishment of new telemetry platforms with the ARGOS Satellite service group (CLS) for each tag under Marine Institute account.

3. Tagging Locations and Methods

All fish were tagged off the Donegal coast often within close proximity to the shore (Figure 1).

Pop-up Satellite Archival Transmitting Tags (PSATs) are designed to track the large scale movements and behaviour of pelagic fish and other animals. Depth, temperature and light-level data are used to estimate location. At a user-specified date and time, a pin is corroded, releasing the PSAT to float to the surface and transmit summarised information via the Argos satellite system. Daily longitude of the migration track, is calculated onboard the PSAT using geo-location by light level techniques. Daily latitude can be calculated from transmitted light level curves using software provided by the tag manufacturer. The results provide the migration path and depth and temperature preferences of the study animal, as well as oceanographic data, in the form of depth-temperature profiles.

All fish were captured using angling methods and squid spreader bar lure setups with up to 11 separate plastic squid lures per rig. Only the last in the train bears a hook. Once the lure is taken the fish are played to the boat as quickly as possible and landed through the ransom door of the vessel using a lip hook technique. Once on board the team performs individual tasks e.g. placing of damp cloth over the eyes of the fish to sedate them, constant irrigation of the gills using fresh saltwater, insertion of the PSAT or accelerometer tag into the dorsal musculature using a tag dart. Two other numbered marker tags are also applied to aid in recovering information form tagged fish. Small samples of tissue are removed for genetic analyses. As quickly as possible the fish are then released back into the water. The onboard procedure takes approximately 3 to 5 minutes. A length and girth are recorded as well as comments on the fish appearance in general, the landing, tagging and release condition of the fish upon release. The position of hook-up and release is noted and recorded. Details of tagging for satellite tags and accelerometer tags is given in Table 1 and 2.

The first tagging surveys took place between the 9th & 12th October on board the 'Leah C' (11m, EIQS5) and the method used to sample fish for tagging was trolling a squid spreader bar on the sea surface. Tagging training was provided by personnel from the University of Acadia in preparing and deploying electronic tags on Bluefin tuna. The tagging vessel proved to be a satisfactory platform for tagging at sea in potentially challenging tagging conditions. All fish were released alive and in good condition.

The second tagging surveys took place between the 22nd- 26th October and 28th October - 1st of November (Table 1). The "Leah C" (11m, EIQS5) was again used and the trolling a squid spreader bar on the sea surface was adopted in the second period also. The favourable weather pattern of easterly winds during the first period broke and gave way to a period of more typical autumn weather; westerly winds and occasionally challenging sea conditions (up to sea state 5). The tagging team fished 10 of 11 days, with 10 bluefin tuna caught over 7 sampling trips with 7 tagged with electronic satellite tags (Table 1 and 2).

Further training was provided by the Stanford University personnel during the second tagging period. Video was taken of tagging and tethering procedures for future reference, training and to demonstrate compliancy to scientific practice for the Health Products Regulatory Authority or Ireland (HPRA). Handling times were again within acceptable limits (Table 3) and all fish were released alive and in good condition.

No significant problems were encountered during tagging operations and no modifications were made to the tagging protocols as outlined to HPRA. All fish were released alive with satellite tags and conventional tags attached (Table 2 and 3). One MiniPAT tag was subsequently recovered shortly after tagging (14P0251) following automated premature detachment from the fish. Some minor modifications to on board procedures have been noted for future tagging activity to improve efficiency. ICCAT data sheets have been prepared for each tagged fish containing details and have been sent to ICCAT.

4. Results

The results of the tagging programme are currently being prepared for scientific publication by the consortium and will be the subject of an extended report subsequently.

Table 1. Operational information and participant institutes on Irish bluefin tuna tagging in 2016

Survey period	Tagging Institute	Tagging vessel	Capture method	No. of MiniPAT deployed
Period # 1	Univ. Acadia, NS	Leah C	Squid spreader	9
9-12 October 2016	Marine Inst., Ireland Univ. Exeter, UK Univ, Coll. Cork/MI, Ireland	Leah C	Squid spreader	
Period # 2	Stanford Univ, USA	Leah C	Squid spreader	7
22 October to 1st November 2016	Marine Inst., Ireland Univ. Exeter, UK Univ, Coll. Cork/MI, Ireland	Leah C	Squid spreader	

Table 2. Operational data from scientific fishing trips conducted as part of the Irish bluefin tagging program 2016.

PSAT Tag Code	1st Floy Tag No.	Tagging Date	PTT No.	Latitude	Longitude	Length (cm)	Half Girth (cm)	Estimated Weight (KG)	Handling Time (Tot)	Name of Boat	Type of Bait/Lure
14P0337	AY0301 1	09/10/2016	144415	54.531629	-8.802518	216	79	172	00:04:30	Leah C	Plastic Squid
14P0307	No Floy	09/10/2016	144413	54.527648	-8.791819	216	73	172	00:03:30	Leah C	Plastic Squid
14P0359	AY0301 7	11/10/2016	144416	54.54443 1	-8.739431	224	76	204	00:04:00	Leah C	Plastic Squid
14P0251	AY0302 2	11/10/2016	144412	54.53621 6	-8.781018	230	78	227	00:04:30	Leah C	Plastic Squid
14P0031	AY0300 5	11/10/2016	144410	54.53449	-8.822452	220	76	181	00:04:30	Leah C	Plastic Squid
14P0330	AY0301 8	12/10/2016	144414	54.541392	-8.780587	206	73	159	00:04:13	Leah C	Plastic Squid
14P0062	AY0301 6	12/10/2016	144411	54.550811	-8.816302	215	69	136	00:04:15	Leah C	Plastic Squid
14P0441	AY0300 9	12/10/2016	144417	54.543189	-8.843507	212	75	204	00:05:30	Leah C	Plastic Squid
16P1172	AY0302 0	12/10/2016	165843	54.530483	-8.810033 4	199	67	136	00:03:55	Leah C	Plastic Squid
16P1268	AY0300 3	22/10/2016	165876	54.52682	-8.63022	206	73	NA	00:03:51	Leah C	Plastic Squid
16P1253	AY0306 4	25/10/2016	165870	54.71355	-8.8669	207	75	NA	00:03:50	Leah C	Plastic Squid
16P1264	None	28/10/2016	165873	54.7047	-8.85935	224	79	NA	00:06:12	Leah C	Plastic Squid
16P1267	AY0308 8	28/10/2016	165875	54.78237	-8.80662	220	74	NA	00:04:14	Leah C	Plastic Squid
16P1249	AY0205 6	29/10/2016	165868	54.7378	-8.82227	240	79	NA	00:04:44	Leah C	Plastic Squid
16P1265	AY0308 5	29/10/2016	165874	54.7606	-8.80552	234	82	NA	00:05:59	Leah C	Plastic Squid
16P1263	AY0307 8	01/11/2016	165872	54.59398	-8.58557	246	87	NA	00:05:13	Leah C	Plastic Squid

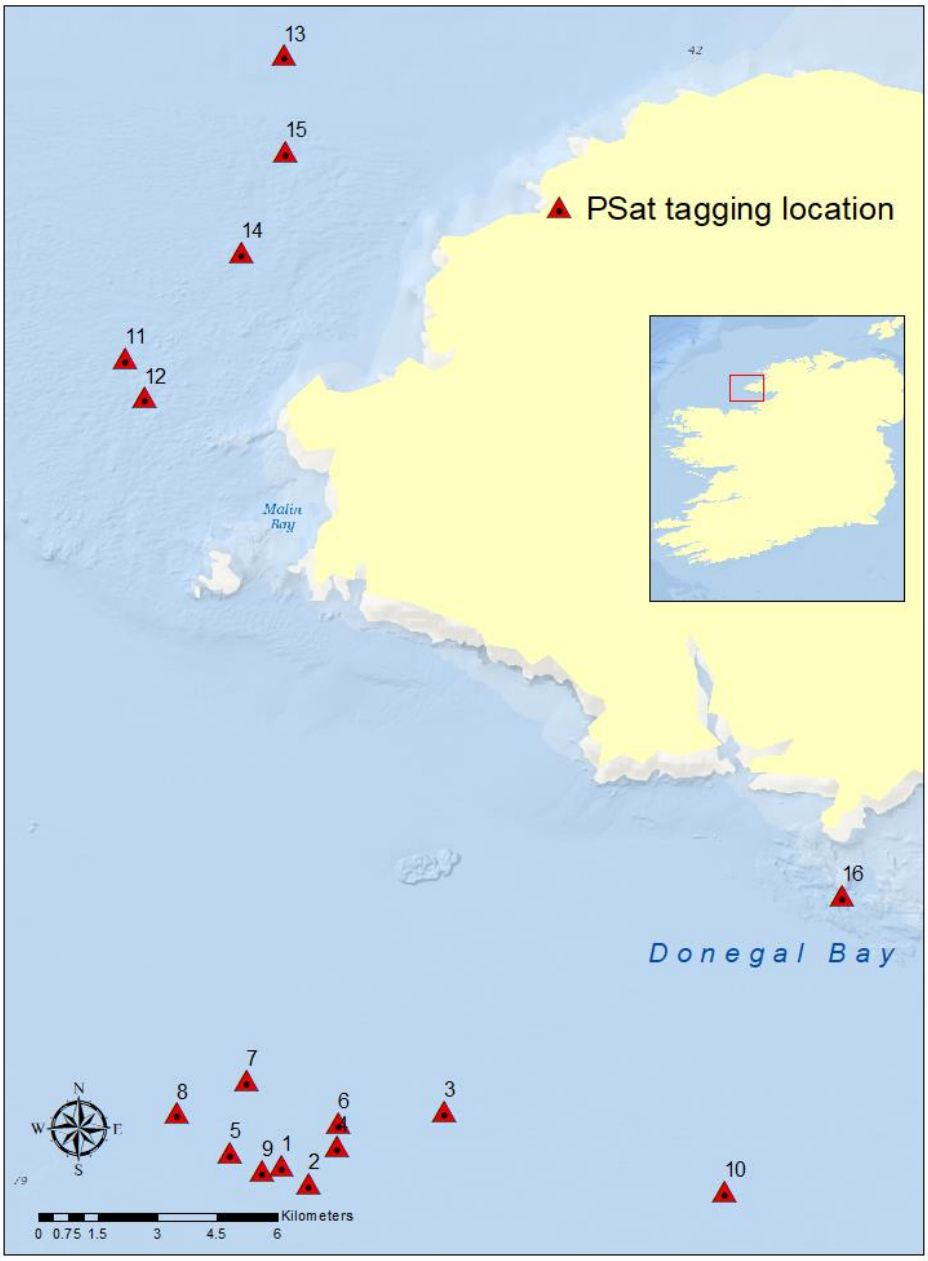

Figure 1. Location of capture of bluefin tuna during 2016 tagging programme – Triangles are PSAT tag locations

5. References

Cosgrove et al. (2008) Bluefin Tuna Tagging in Irish Waters. Fisheries Resource Series, Bord Iascaigh Mhara (Irish Sea Fisheries Board), Dun Laoghaire, Ireland. Vol. 6, 2008, 16pp. ISSN 1649-5357 ISBN 1-903412-29-3.

Block, B. A. et al. (2005) Electronic tagging and population structure of Atlantic bluefin tuna. Nature 434: 1121-1127.

Stokesbury, M. J. W. et al. (2007) Results of satellite tagging of Atlantic bluefin tuna, Thunnus - thynnus,off the coast of Ireland. Hydrobiologia 582: 91-97 (TAG & Stanford).

Neat, F., Horton, T. & Campbell (2014) Atlantic bluefin tuna movements in the high latitudes of the NE Atlantic: Initial results from satellite tagging west of Scotland. POLSHIFTS, April 2015, Marine Research Institute of Iceland

6. Acknowledgements

Particular thanks go to Adrian Molloy and Michael Callaghan who skippered the vessels and to a number of anglers who caught fish for the project. Leonie O'Dowd (MI) provided assistance with tendering and procurement.

7. Appendix I Research Mortality Allowance ICCAT

INTERNATIONAL COMMISSION FOR THE CONSERVATION OF ATLANTIC TUNAS
COMMISSION INTERNATIONALE POUR LA CONSERVATION DES THONIDES DE L'ATLANTIQUE
ICCAT CICTA CICAA
COMISIÓN INTERNACIONAL PARA LA CONSERVACIÓN DEL ATÚN ATLÁNTICO

Madrid – 10 October 2016

ICCAT GBYP CIRCULAR # 1356 / 2016

SUBJECT: BFT RESEARCH MORTALITY ALLOWANCE (RMA)

I have the honor to transmit to you the attached information on the ***"Bluefin Research Mortality Allowance for the ICCAT Atlantic-wide Research Programme for Bluefin Tuna (ICCAT Rec. 11-06) - Special Documents and Procedures"***, which includes the rules established regarding the RMA, current list of participating entities in ICCAT GBYP tagging activities and biological sampling in 2016, as well as the ICCAT GBYP Logbook for RMA.

Please accept the assurances of my highest consideration.

Driss Meski
Executive Secretary

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SCRS Chairman:	D. Die		

- **Head Delegates**
- **Cooperating Parties, Entities, or Fishing Entities**

cc: Head Scientists

Attachments: Rules for RMA;
List of Participating Entities;
GBYP Logbook-RMA

Corazón de María, 8 – 28002 MADRID – Spain – Espagne – España – Tel: +34 91 416 5600 – Fax: +34 91 415 2612 – http://www.iccat.int – info@iccat.int

BLUEFIN RESEARCH MORTALITY ALLOWANCE FOR THE ICCAT ATLANTIC-WIDE RESEARCH PROGRAMME FOR BLUEFIN TUNA (ICCAT REC. 11-06)

SPECIAL DOCUMENTS AND PROCEDURES

In accordance with ICCAT Rec. 11-06, Art. 3, "Scientific institutions and entities participating in the ICCAT GBYP research activities are exempt from the Commission's conservation measures on bluefin tuna for up to a maximum of an overall amount of 20 metric tons of bluefin tuna annually ("Research Mortality Allowance" or "RMA") taken or killed incidentally during the GBYP biological sampling programme or the tagging activities, as approved by the SCRS and endorsed by the Commission. These tunas cannot be sold for commercial purposes and shall be reported in detail to ICCAT and SCRS at the end of each Phase of GBYP, according to specific rules that will be established by the ICCAT Secretariat and attached to the research contracts", the following rules are established:

1) Each entity engaged in any ICCAT GBYP activity for tagging or biological sampling, that deliberately or incidentally killed any bluefin tuna has to complete the form "GBYP LOGBOOK – RMA" (attached as **Annex 1**). This form must be completed on board the vessel or trap, signed by the researcher on board, by the vessel or the trap master and then delivered to the ICCAT Secretariat, by e-mail or fax, within a maximum of 24 hours of the mortality event.

2) The ICCAT Secretariat is responsible for informing all entities concerned whenever the maximum of 20 tons of Research Mortality Allowance is reached. From this moment on no more mortality is allowed.

3) Any fish included in the ICCAT GBYP Research Mortality Allowance that is landed for research purposes, for the crew´s personal consumption, or for charitable purposes is exempted from the BCD in the ICCAT Rec. 11-20. A copy of the "GBYP LOGBOOK – RMA" must accompany any fish destined for the crew´s personal consumption or for charitable purposes.

4) Any bluefin tuna recorded as "Research Mortality Allowance" cannot be used for any commercial purposes. If any of these fish are found on the market, this will be considered as IUU catch.

5) Each year, the ICCAT GBYP will set-up a specific register, available on the ICCAT GBYP web-page, with a recapitulation of the information collected from the "GBYP LOGBOOK – RMA".

6) The current list of entities involved in ICCAT GBYP activities in 2016, either for tagging or biological sampling, is provided in **Annex 2**.

ANNEX 1

ATLANTIC-WIDE RESEARCH PROGRAMME FOR BLUEFIN TUNA (ICCAT-GBYP)

REPORT FOR GBYP RESEARCH MORTALITY ALLOWANCE (Rec. 11-06)

GBYP LOGBOOK - RMA

1.Date:	2.Document number: (attributed by ICCAT-GBYP)

3.Entity in charge of the research activity:	4.Research activity:

Address:	Phone (including that of the scientific responsible for the activity):
Country:	e-mail:

Vessel or trap name:	Flag:	Vessel or trap ID number:

5.Area of catch (geographical description):	6.Location (latitude-longitude):

7. DESCRIPTION OF THE MORTALITY INDUCED				
Gear	Number of fish	Length (cm)	Round weight (kg)	Final destination*
TOTAL				

Name of the scientist on board and title:	Signature:

Name of Captain of the vessel/trap:	Signature

The form MUST be delivered to ICCAT by e-mail (gbyp@iccat.int) or fax (+34 91 415 2612) within a maximum of 24 hours of the research mortality event.

* Dead bluefin tuna derived from a GBYP research activity cannot be sold on the market or traded under any circumstances. The mortality report shall distinguish between dead fish discarded at sea, fish for crew's personal consumption and fish for scientific purposes.

ANNEX 2

LIST OF PARTICIPANTS IN ICCAT GBYP TAGGING ACTIVITIES AND BIOLOGICAL SAMPLINGS IN 2016

1) Alleanza Pescatori Ricreativi (APR), Genova, EU-Italy
2) AquaBioTech Ltd.– EU-Malta
3) Asociación Catalana per una Pesca Responsable (ACPR), Barcelona, EU-Spain
4) AZTI-Tecnalia –EU-Spain
5) Balfegó & Balfegó – EU-Spain
6) Carloforte Tonnare Piam s.r.l. – EU-Italy
7) Centro di Competenza sulla Biodiversità Marina (COM.BIO.MA.) – EU-Italy
8) FIPSAS-CIPS, Roma – EU-Italy
9) Fish & Fish Ltd. – EU-Malta
10) Great Tuna Race – EU-Spain
11) IFREMER – EU-France
12) Institute of Marine Research - Norway
13) Institut National de la Recherche Halieutique (INRH) – Royaume du Maroc
14) Instituto Español de Oceanografía (IEO) – EU-Spain
15) Instituto Português do Mar e da Atmosfera (IPMA) - EU-Portugal.
16) Large Pelagics Group, St.Andrews Biological Station (SABS) – Canada
17) Mare Blu Tuna Farm Ltd. – EU-Malta
18) The Marine Institute, EU-Ireland
19) MFF Ltd.– EU-Malta
20) National Research Institute for Far Seas Fisheries (NRIFSF) – Japan
21) NECTON Marine Research Society – EU-Italy
22) Prof. Oray, Isik - Turkey
23) Societé MAROMADRABA s.a.r.l. - Royaume du Maroc
24) TAXON Estudios Ambientales S.L.– EU-Spain
25) Tuna Graso S.A.U. – EU-Spain
26) Università di Bologna (UNIBO) – EU-Italy
27) Università di Cagliari (UNICA) – EU-Italy
28) Università di Genova (UNIGE) – EU-Italy
29) University of Istanbul, Department of Fisheries - Turkey
30) UNIMAR Soc. Coop. – EU-Italy
31) WWF European Policy Programme – EU-Italy

8. Appendix II derogation to conduct scientific research fishing 2016

AN t-ÚDARÁS UM CHOSAINT IASCAIGH MHARA
SEA-FISHERIES PROTECTION AUTHORITY
Headquarters, Park Road, Clogheen, Clonakilty, Co. Cork, Ireland
T +353 (0) 23 8859309
F +353 (0) 23 8858796
W www.sfpa.ie

29th September 2016

DSR 14/2016

Dr Paul Connolly
Marine Institute
Ireland

DEROGATION TO CONDUCT FISHING FOR SCIENTIFIC RESEARCH

"LEAH C"

Dear Dr Connolly

Please note that the Sea-Fisheries Protection Authority is pleased to agree to your request for a specific derogation to conduct fishing for scientific research subject to compliance with the terms outlined below:

Type of survey: A research consortium has been formed comprising the Marine Institute (Ireland), Stanford University (USA), Exeter University (UK), and the Centre for Environment, Fisheries and Aquaculture Science (Cefas; UK). This consortium will aim to tag between 8 and 16 adult Atlantic Bluefin tuna (ABFT) with electronic pop-up satellite archival tags (PSATs; supplied by the Stanford/University of Exeter and the Marine Institute) in the coastal waters off the north west coast of Ireland during October 2016. The consortium will also undertake biological sampling of fin and muscle tissue.

Vessel Details: Name: **LEAH C**

Area coverage: ICES VIa & VIIb; Donegal Bay.

Period: Between 10th & 31st October 2016, approx. 20 days in total.

Target Species: Bluefin Tuna (Thunnus thynnus)

Scientific Staff: Dr Connolly & Marine Institute staff along with colleagues from Stanford, Exeter and CEFAs (at least two on board at all times during trial)

Please be advised that a copy of this document should be retained onboard the vessel whilst engaged in the scientific work.

Finally I would like to wish you and your team every success with the project.

Christopher Nalty
Sea-Fisheries Operations Manager
cc: [Naval Service, SFPA-SMT, SFPA-Senior Port Officers, European Commission]